EPA Region 7 TMDL Review

TMDL ID: KS-LA-12-W050_4 **State:** KS
Document Name: SAND CREEK (NITRATE)

Basin(s): LOWER ARKANSAS RIVER
HUC(s): 11030012
Water body(ies): SAND CREEK
Tributary(ies): BEAVER CREEK, MUD CREEK
Pollutant(s): NITRATE AS NITROGEN

Submittal Date: 12/11/2006 **Approved:** Yes

Submittal Letter

State submittal letter indicates final Total Maximum Daily Load(s) (TMDL) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by EPA, date of receipt of any revisions, and the date of original approval if submittal is a phase II TMDL.

Submittal letter and TMDL document received by EPA 12/11/2006. Letter submitting public comments and responses completing the submittal received 01/09/2007.

Water Quality Standards Attainment

The water body's loading capacity (LC) for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards (WQS) [40 CFR § 130.7(c)(1)]. A statement that WQS will be attained is made.

The TMDL addresses the listed pollutant directly. The loading capacity is determined through the use of a load duration curve. This method relates the targeted nitrate concentration to the flow in the water body resulting in a load which will meet water quality standards.

The LC should result in the attainment of water quality standards.

Numeric Target(s)

Submittal describes applicable WQS, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Applicable water quality standards are given along with their citation in the administrative records. The designated uses of this segment are Expected Aquatic Life Support, Primary Contact Recreation "B", and Food Procurement in the main stem segment. The tributary segments (Mud and Beaver creeks) uses are Expected Aquatic Life Support and Secondary Contact Recreation "b". The impaired use is Expected

Aquatic Life Support. The water quality standards that apply directly to the impaired use are narrative. "The introduction of plant nutrients into streams, lakes or wetland from artificial sources shall be controlle prevent the accelerated succession or replacement of aquatic biota or the production of undesirable quantities or kinds of aquatic life (KAR 28-16-28e(c)(2)(A))."

This TMDL applies the Domestic Water Supply criterion of 10 mg/L Nitrate as Nitrogen as a numeric translator. EPA agrees that this is a protective translator at this time and further monitoring will result in a refinement of the TDML if it is found that the water body remains impaired.

Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety (MOS) that do not exceed the LC. If submittal is a phase II TMDL there are refined relationships linking the load to WQS attainment. If there is an increase in the TMDL there is a refined relationship specified to validate the increase in TMDL (either load allocation (LA) or waste load allocation (WLA)). This section will compare and validate the change in targeted load between the versions.

The numeric target of 10 mg/L as nitrogen is set to directly address the pollutant causing the impairment. An additional goal is set to reduce total nitrogen by 55% in accordance with the Kansas Water Nutrient Reduction Plan.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, nonpoint and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered. If this is a phase II TMDL any new sources or removed sources will be specified and explained.

There are 12 NPDES permitted discharges in the watershed. Two of these, Newton WWTP (M-LA-13-IO01) and Walton WWTP (M-LA-13-OO01), are municipal facilities that contribute significant nitrate loads which affect monitoring site 535. Fifteen confined animal feedlots are located in the watershed with four in the 30-meter riparian buffer. These facilities are designed to minimize storm water runoff entering the facility and designed to retain runoff up to a 25-year, 24-hour rainfall event. Additionally, the exceedances measured do not occur at the 1-5 % exceedance flows expected to be impacted by these systems.

Non-point sources included in the submittal are failing septic systems and land use. Land use is predominantly cultivated cropland (70% overall 41% in 30-meter riparian buffer) with smaller percentages in urban (7%) and prairie (6%). The submittal quantifies watershed runoff rates at varying rainfall intensities. Background loading may also be expected from soils, wildlife, streamside vegetation or stream sediment.

It seems all sources have been identified.

Allocation - Loading Capacity

Submittal identifies appropriate WLA for point, and load allocations for nonpoint sources. If no point sources are present the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2(i)]. If this is a phase II TMDL the change in LC will be documented in this section.

Eighty percent of measured excursions occurred during low flow conditions. This is a critical flow condition under which WLA reductions will be targeted.

WLA Comment

Submittal lists individual WLAs for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to WQS excursions, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLAs. Any such exceptions must be explained to a satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a phase II TMDL any differences in phase I and phase II WLAs will be documented in this section.

The treatment plant at Newton (KS0038971) is identified as the major contributor. The WLA is set to 174.36 pounds of nitrogen per day for this facility at its outfall. This relates to a concentration of 6.96 mg/L nitrate nitrogen in the outfall and a monitoring site concentration of 3.34 mg/L as nitrogen. This WLA results in a reduction greater than necessary to achieve water quality standards and in line with the Kansas Surface Water Nutrient Reduction Plan.

LA Comment

Includes all nonpoint sources loads, natural background, and potential for future growth. If no nonpoint sources are identified the LA must be given as zero [40 CFR § 130.2(g)]. If this is a phase II TMDL any differences in phase I and phase II LAs will be documented in this section.

The load allocation is the difference of the load capacity less the WLA and MOS. This is expressed in figure 7 by the load duration curve.

Margin of Safety

Submittal describes explicit and/or implicit MOS for each pollutant [40 CFR § 130.7(c)(1)]. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided. If this is a phase II TMDL any differences in MOS will be documented in this section.

The margin of safety is explicit. The WLA is set at a level 30% lower than the 10 mg/L water quality criterion.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of WQS. If this is a phase II TMDL any differences in conditions will be documented in this section.

Seasonal variation is accounted for in the use of a load duration curve. The LC is set based on hydrology which follows seasonal patterns. Additionally, a critical period is defined as most excursions occur at low flows. To address this critical period the WLA is set 30% below the identified criterion.

Public Participation

Submittal describes required public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].

A public hearing was held in Hutchinson on September 13, 2006. The Lower Arkansas Advisory Committee met to discuss the TMDLs on March 8, June 7, and October 12, 2006. An internet site

was maintained to convey information to the public concerning the TMDL. A meeting was held with a representative from the City of Newton concerning the TMDL.

Copies of comments and responses were included in the submission.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used) [40 CFR § 130.7].

Kansas Department of Health and Environment will collect samples bimonthly in 2006 and 2010 at statior 535 to assess the impairment.

Reasonable Assurance

Reasonable assurance only applies when less stringent WLAs are assigned based on the assumption of nonpoint source reductions in the LA will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads.

Reasonable assurances do not apply. Reductions in point source loading include a 30% margin of safety to ensure that excursions of the criterion will not occur at critical low flow periods. At higher flows, excursions are not typically driven by point sources and further reductions in point source loads to address these periods are not likely to have any measurable effect.